

# New Microfossil Records in Time and Space

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## Synopsis

A Jurassic species of the hitherto Palaeozoic Microproblematicum genus *Aphralysia* is described as *A. jurassica* sp. nov. *Lithothrix* (Algae: Corallinaceae), known from one living species on the North American Pacific coast, now has a fossil record in *L. antiquum* sp. nov. from the late Pleistocene of Mauritius (Indian Ocean).

## I. A Jurassic *Aphralysia*

*Aphralysia* is a somewhat problematic fossil, described by Garwood (1914) as an alga and usually listed as one subsequently. However, Belka (1981) claims it convincingly as a foraminifer. It is a crusting or nodule-forming organism, which in typical vertical cross-section shows a 'fish-scale' or 'blister' pattern of successive irregular layers of thin, calcareous-walled cells which are mostly segment-shaped, i.e. each having a conspicuous outwardly-convex wall and resting below on earlier cells. Other cross-sections, showing irregular vermicular structures, are interpreted by Belka as the horizontal section.

Several species of the genus have been described from the Carboniferous. It is therefore of interest to record the occurrence of a Jurassic example.

## MICROPROBLEMATICA

Genus *APHRALYSIA* Garwood, 1914, emend. Mamet & Roux 1975, Belka 1981.

TYPE SPECIES. *A. carbonaria* Garwood 1914.

### *Aphralysia jurassica* sp. nov.

Figs 4-6

DESCRIPTION. Crusting *Aphralysia* in which the irregularly-layered cells typical of the main part of the growth show in vertical section as arc-shaped outer walls of dark calcite about 0.005 mm thick. The transverse cell-diameters are about 0.070 mm (up to 0.090 mm) and cell-heights vary according to the convexity and arrangement of the cells beneath, but are always less than the diameters. There is a general irregularity and very occasionally an elongate cell-section is present. A section showing a well-developed growth of smaller vermicular cells, irregularly to tortuously arranged, of which only the very occasional example shows the size and form of the more typical cells, may be a near-horizontal cut.

In the type material the cells show a light brown coloured calcite infill, and the growth encrusts a bivalve shell.

HOLOTYPE. British Museum (Natural History), Dept Palaeontology, register number V.60941. From the Middle Jurassic (Bathonian), Great Oolite, White Limestone, of Quenington Hill, Quenington, Cirencester, Gloucestershire. Figs 4-6.

COMPARISONS. If *A. jurassica* is compared with the other species of the genus (all Carboniferous, except for a qualified Silurian record by Héroux *et al.* 1977), its structures are very much smaller than those of *A. carbonaria* (Garwood 1914, Mamet & Roux 1978)

and *A. garwoodi* (Hallett 1970). Of the three species described by Mamet & Roux (1975), *A. matthewsi* shows much smaller structures than *A. jurassica* and different cell-form. *A. ferreoli* shows elongate cells in the main layer and a near absence of the distinctively segment-shaped cells typical of the genus. *A. jurassica* seems most similar to *A. capriorae*; the Jurassic material is very limited for an exact comparison of these variable growths.

REMARKS. *Aphralysia* has usually been listed as an alga: Belka claims it as a foraminifer. Like all such crusting organisms, animal or plant, it varies considerably, and named species have necessarily to be defined morphologically on typical structure as preserved, even if they may originally have been ecophenes. For this reason it seems best to describe the Jurassic fossil as new. Whilst perhaps it is not surprising that such a lowly form of Palaeozoic life should persist into mid-Mesozoic, it is surprising that apparently it has not been found before.

STRATIGRAPHIC HORIZON. Quenington Hill and the adjacent Fowler's Hill (SP 1445 0455) are two named roads traversing the same limestone hill: both have only been exposed geologically in the last decade by very rapid 'dig-and-fill' trenching for drainage, etc. Each showed a succession of White Limestone beds capped by Kemble Beds facies. An algal limestone on Fowler's Hill yielded *Dobunniella coriniensis* Elliott, *Pycnoporidium lobatum* Yabe & Toyama, *Ortonella* sp. and cf. *Girvanella* sp., apparently representing the algal horizon described by Elliott (1975) in the upper part of the White Limestone at Daglingworth, Glos. The Quenington Hill *Aphralysia* (with *Pycnoporidium* sp.) occurs at a slightly lower level than this; the only alga from the higher level on Quenington Hill was the well-known *Solenopora jurassica* Brown (also found at Daglingworth).

## II. A fossil *Lithothrix*

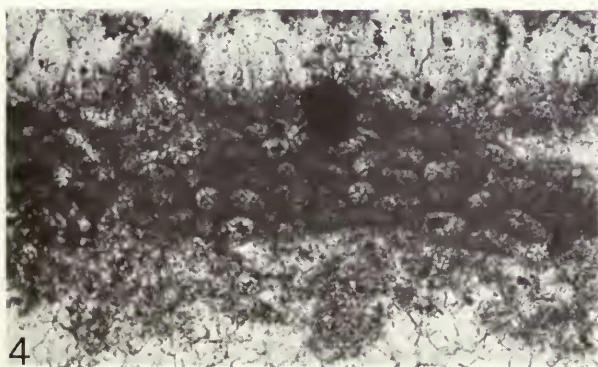
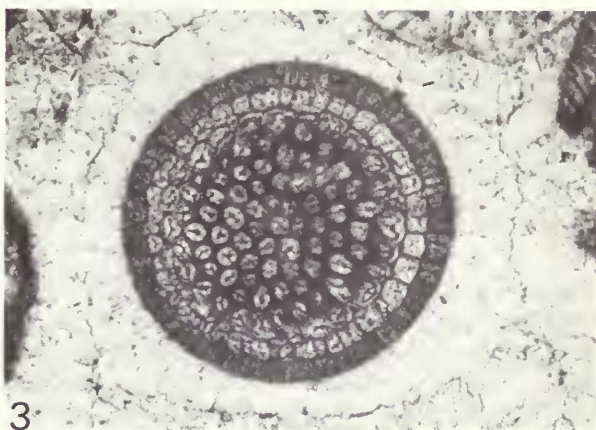
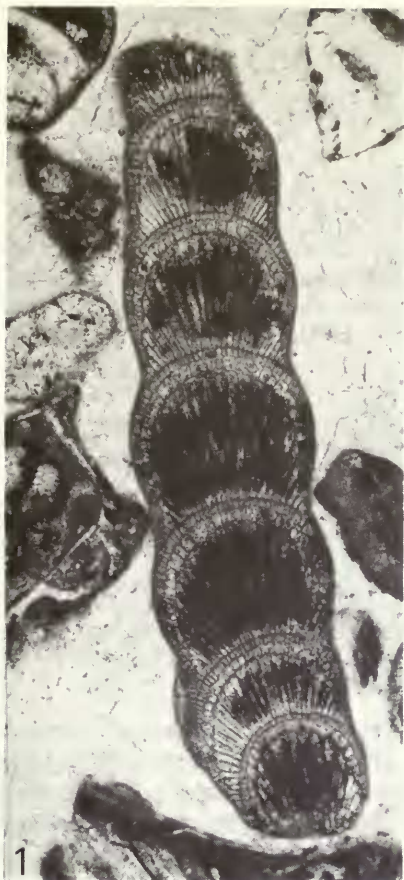
*Lithothrix* is an uncommon and very distinctive little articulated coralline, known from one living species *L. aspergillum* Gray from the Pacific coast of North America.

It differs in thin-section from all other similar corallines by the arrangement of the cells within the units, most of the medullary area being occupied by one layer only of markedly elongate, thick-walled, dark-staining longitudinal cells. These medullary layers are largely independent in growth of the small peripheral cells, which gave rise to side-branches and to conceptacles. The unusual structure and the growth occasioning it have caused considerable confusion in interpretation (Ganesan & Desikachary 1970, Cabioch 1972, Johansen 1974).

Whatever the detailed anatomical validity of these interpretations, the thin-section appearance of *Lithothrix* is unmistakable. It is therefore of great interest to record a fossil species, which comes from the late-Pleistocene raised reefs of Mauritius in the Indian Ocean. This shows the characteristic cell-morphology of the genus, but differs in external proportions from *L. aspergillum*. Living *Lithothrix* is only known on the Californian-Vancouver coast of North America, and this remarkable occurrence is all we know of its past distribution.

**Figs 1-3** *Lithothrix antiquum* sp. nov. Late Pleistocene raised reef; Mauritius, Indian Ocean. All from British Museum (Natural History), Dept Palaeontology, register number V.60116. Fig. 1, **holotype**; longitudinal section, portion of branch,  $\times 70$ . Fig. 2, random section showing conceptacle (top left),  $\times 78$ . Fig. 3, transverse section,  $\times 150$ .

**Figs 4-6** *Aphralysia jurassica* sp. nov., **holotype**. Middle Jurassic (Bathonian), Great Oolite, White Limestone; Quenington Hill, Quenington, Gloucestershire, England. All  $\times 90$ ; British Museum (Natural History), Dept Palaeontology, register number V.60941. Fig. 4, portion of encrusting growth showing normal cell-development; vertical section. Fig. 5, portion showing layer of vermicular cells (? horizontal section). Fig. 6, another portion of normal cell-development.



## Alga CORALLINACEAE

Genus *LITHOTHRIX* Gray, 1867*Lithothrix antiquum* sp. nov.

Figs 1–3

DIAGNOSIS. *Lithothrix* species in which the 'units' or 'segments' of the calcified branches are wider than high.

DESCRIPTION. Represented fossil by debris, including pieces showing successions of six, seven or eight units; also a presumed lateral conceptacle. Most units are from 0.27–0.36 mm wide: the height is usually a little less than this, occasionally equal. In the living *L. aspergillum* the units are normally consistently elongate, i.e. the height exceeds the width.

The central (medullary) elongate cells are thick-walled and in a conspicuous dark preservation, as in the living species when stained. The peripheral layers of small squarish or rectangular cells are thinner-walled, again as in the living species. A single example of a lateral structure (Fig. 2) is biologically 'empty' (calcite-filled), and is interpreted as probably a former asexual conceptacle. No aperture is seen but the plane of section could have missed it; this infilling is usual in many fossil conceptacles generally. The position relative to the vegetative branch is like that of the living species.

HOLOTYPE. British Museum (Natural History), Dept Palaeontology, register number V.60116. From the late Pleistocene raised reefs of Mauritius (Indian Ocean). Fig. 1.

PARATYPES. The specimens shown in Figs 2–3, from the same locality and horizon. Reg. no. V.60116.

REMARKS. It is regretted that no details of the exact site on Mauritius where the original sample was collected have been preserved. The thin section shows an assemblage of small foraminifera, *Lithothrix*-pieces, and debris of other algae and invertebrates, all set in clear calcite. The genus should logically be represented elsewhere in the Indo-Pacific between Mauritius and North America, but is not known thus to me.

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